

**INTERFACE BETWEEN A PIECE OF BAGGAGE AND A PRECONCENTRATOR  
COLLECTOR**

**Cross-Reference to Related Applications**

This is ~~related to~~ a continuation of Application No. 10/224,719 filed August 21, 2002, which is related to Application No. 10/224,688, entitled "Method of Analyzing the Constituents of Air Extracted from the Interior of a Piece of Baggage" also filed contemporaneously herewith August 21, 2002.

**Technical Field**

This invention relates to the field of testing for explosives and more particularly, using a testing unit capable of detecting trace amounts of explosives such as an ion trap mobility spectrometer to analyze the constituents of air extracted from the interior of a piece of baggage to determine whether the baggage contains explosives.

**Background**

Aircraft and particularly, those operated by passenger airlines, are considered terrorist targets. Thus, aviation security is essential to the safety of airline passengers. One attempt to minimize the possibility of a terrorist attack includes screening all baggage (i.e., luggage) that enters the aircraft. Specifically, both carry-on and checked baggage are screened for bombs and/or explosives.

Some of the current methods used to screen carry-on and checked baggage include manual inspection, X-ray, and trace detection. Manual inspection is invasive and often time consuming. Utilizing X-ray equipment is a non-invasive procedure. However, that method requires the operator of the X-

Fig. 4 illustrates one embodiment of step 302 – the step of inserting a baggage-preconcentrator interface 400 into a piece of baggage 404. Specifically, Fig. 4 illustrates an individual inserting a baggage-preconcentrator interface 400 into the zipper 402 of a piece of baggage 404. Figs. 5A and 5B are enlarged views of the baggage-preconcentrator interface 400 inserted within the zipper 402 of the baggage 404. Those figures illustrate that the zipper 402 includes two rows of teeth 502 and a two sliders 504, which further include pull tabs 506. And when the baggage-preconcentrator interface 400 is inserted into the zipper 402, the baggage-preconcentrator interface 400 grips at least a portion of each row of teeth 502.

Once the baggage-preconcentrator interface 400 is gripping the zipper's teeth 502, it may be preferable to close the zipper 402. Closing the zipper may include the step of sliding one or both of the sliders 504, via the pull tabs 506, toward the baggage-preconcentrator interface 400 until the slider(s) 504 is adjacent and/or abuts the baggage-preconcentrator interface 400. Some sliders 504 may include locking rings 508, which allow the sliders 504 to be locked together, thereby preventing someone from opening the zipper 402 without first removing a lock. As will be discussed below, it may be preferable for the baggage-preconcentrator interface 400 to include corresponding (i.e., complementary) locking rings 624. If the baggage-preconcentrator interface 400 includes locking rings 624, it may be desirable to slide the slider(s) 504 toward the baggage-preconcentrator interface 400 until the openings within the locking rings 508, 624 align with one another. Once the locking rings 508, 624 are aligned, it would be possible to secure the baggage-preconcentrator interface 400 to the sliders 504 by passing a lock or other type of fastening means through the holes within the locking rings 508, 624.

initially contact one another, the baggage-preconcentrator interface 400 may need a means for opening the lips so that the baggage-preconcentrator interface 400 can be inserted into the baggage. Similarly, if the baggage-preconcentrator interface 400 has a gap and opening analogous to those illustrated in Fig. 8A, a means for enlarging the opening and/or gap may be needed in order to insert the baggage-preconcentrator interface 400 into the baggage. Thus, it may be preferable for the clamp 608 to include a lever 614 that is connected to the top lip 610, such that when the lever 614 is moved (i.e., pressed) toward the center of the baggage-preconcentrator interface 400, the size of the opening 618 will increase. Further assuming that the clamps 608 are diametrically opposed to one another, it may be preferable for the lever 614 to include grooves 620 (i.e., channels, serrations, etc.) so that an individual is able to have a firm grasp of the levers 614 when the individual simultaneously squeezes the levers 614 toward one another with his hand.

As mentioned above, it is preferable for the baggage-preconcentrator interface 400 to be inserted into the zipper 402 of a piece of baggage 404 as shown in Figs. 4 and 5. Thus, the shape of the perimeter of the baggage-preconcentrator interface 400 in Fig. 6 allows the sliders 504 of the zipper to abut baggage-preconcentrator interface 400. That is, the shape of the perimeter of the baggage-preconcentrator interface 400, which could be characterized as a serpentine shape when viewed from the top of the baggage-preconcentrator interface 400, provide a means for a slider 504 to zip up adjacent to and abut the baggage-preconcentrator interface 400. The abutments may include a portion of the top securing member 609 other than the locking rings 624, the top locking rings 624 and/or a portion of the locking rings below the openings 626 therein.

As mentioned above, some zippers include sliders 504 that have means for allowing a lock to secure (i.e., fasten) two sliders 504 together. Thus, it may be preferable for the baggage-preconcentrator interface 400 to include means for securing itself to two sliders 504 when such sliders abut the baggage-preconcentrator interface 400. One such means includes locking rings 624 connected to the baggage-preconcentrator interface 400. Each locking ring 624 includes an opening 626 that can be aligned with an opening in the baggage's locking ring 508. Upon placing a lock or some other fastening means through both the baggage-preconcentrator interface and baggage locking rings 508, 624, the baggage-preconcentrator interface 400 will be secured to the zipper's slider 504. Although it may be preferable for the baggage-preconcentrator interface 400 to